

immunosuppressant or an anti-inflammatory agent. When the condition being treated is chronic inflammation, the additional agent can be an anti-inflammatory agent. When the condition being treated is a viral infection or conditions induced by a viral infection, the additional agent can be an antiviral agent. The additional agents to be co-

5 administered, such as anticancer, immunosuppressant, anti-inflammatory, and antiviral agents can be any of the well-known agents in the art, including those that are currently in clinical use. The determination of appropriate type and dosage of radiation treatment is also within the skill in the art or can be determined with relative ease.

Currently, treatment of the various conditions associated with abnormal

10 apoptosis is limited by the following two major factors: (1) the development of drug resistance and (2) the toxicity of known therapeutic agents. In certain cancers, for example, resistance to chemicals and radiation therapy has been shown to be associated with inhibition of apoptosis. (Desoize, B. (1994) *Anticancer Res.* 14:[221-224]2291-2294). Similarly, some therapeutic agents have deleterious side effects, including non-

15 specific lymphotoxicity, renal and bone marrow toxicity.

The methods described herein address both these problems. Drug resistance, where increasing dosages are required to achieve therapeutic benefit, is overcome by co-administering the compounds described herein with the known agent. The compounds described herein appear to sensitize target cells to known agents and, accordingly, less

20 of these agents are needed to achieve a therapeutic benefit.

The sensitizing function of the claimed compounds also addresses the problems associated with toxic effects of known therapeutics. In instances where the known agent is toxic, it is desirable to limit the dosages administered in all cases, and particularly in those cases where drug resistance has increased the requisite dosage.

25 When the claimed compounds are co-administered with the known agent, they reduce the dosage required which, in turn, reduces the deleterious effects. Further, because the claimed compounds are themselves both effective and non-toxic in large doses, co-administration of proportionally more of these compounds than known toxic therapeutics will achieve the desired effects while minimizing toxic effects.

USA 91:4708-4712; Stevens, S.Y. et al., (1996) *J. Am. Chem. Soc.* **118**:10650-10651; Gordon, E.M., et al., (1994) *J. Med. Chem.* **37**(10):[5]1385-1401; and U.S. Patent Nos. 4,110,337 and 4,076,823, which are all incorporated by reference herein. For illustration, the following general methodologies are provided.

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1. Preparation of 1,4-benzodiazepine-2-one compounds

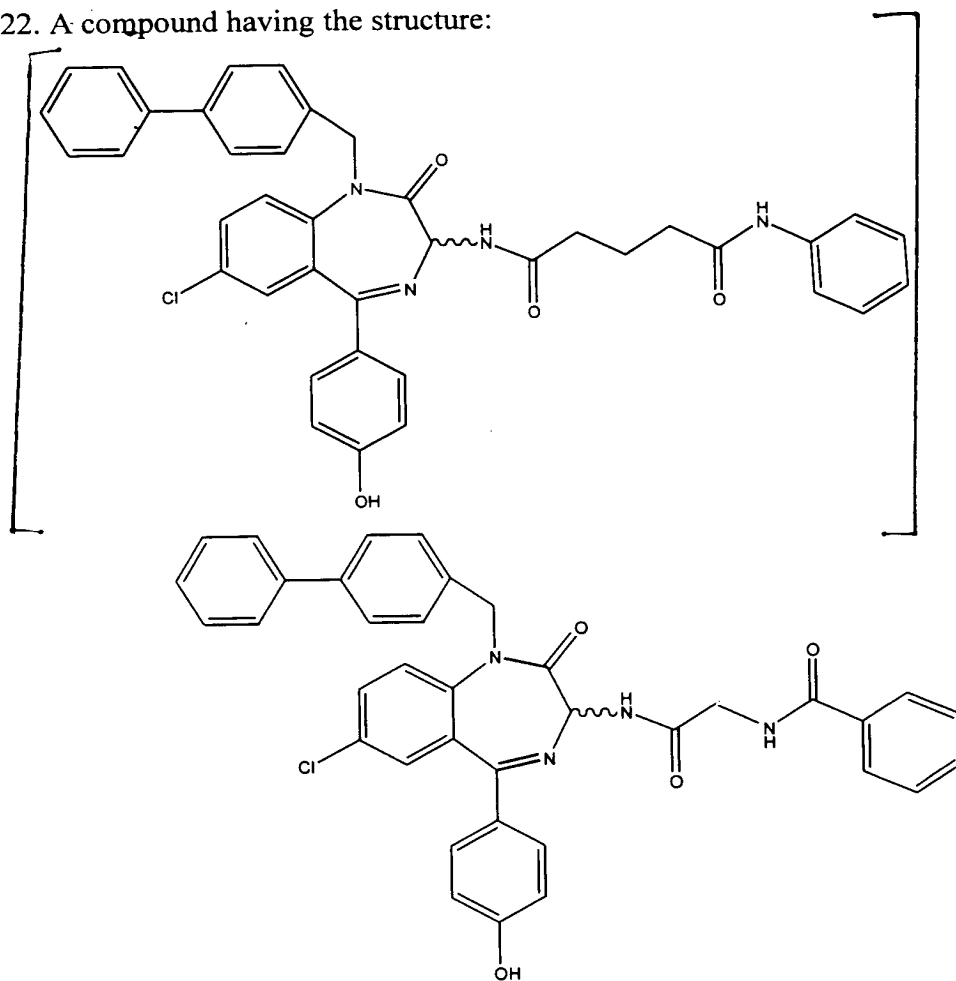
Improved solid-phase synthetic methods for the preparation of a variety of 1,4-benzodiazepine-2-one derivatives with very high overall yields have been reported in the literature. See, for example, Bunin and Ellman ((1992) *J. Am. Chem. Soc.* **114**:10997-10998). Using these improved methods, the 1,4-benzodiazepine-2-ones can be constructed on a solid support from three separate components: 2-aminobenzophenones, α -amino acids, and (optionally) alkylating agents, as shown in the reaction scheme of Figure 1.

Preferred 2-aminobenzophenones include the substituted 2-aminobenzophenones, for example, the halo-, hydroxy-, and halo-hydroxy-substituted 2-aminobenzophenones, such as 4-halo-4'-hydroxy-2-aminobenzophenones. A preferred substituted 2-aminobenzophenone is 4-chloro-4'-hydroxy-2-aminobenzophenone. Preferred α -amino acids include the 20 common naturally occurring α -amino acids as well as α -amino acid mimicking structures, such as homophenylalanine, homotyrosine, and thyroxine.

Alkylating agents include both activated and inactivated electrophiles, of which a wide variety are well known in the art. Preferred alkylating agents include the activated electrophiles p-bromobenzyl bromide and t-butyl-bromoacetate.

In the first step of such a synthesis, the 2-aminobenzophenone derivative, (1) of Figure 1, is attached to a solid support, such as a polystyrene solid support, through either a hydroxy or carboxylic acid functional group using well known methods and employing an acid-cleavable linker, such as the commercially available [4-(hydroxymethyl)phenoxy]acetic acid, to yield the supported 2-aminobenzophenone, (2). See, for example, Sheppard and Williams, ((1982)) *Int. J. Peptide Protein Res.* **20**:451-454). The 2-amino group of the aminobenzophenone is preferably protected prior to reaction with the linking reagent, for example, by reaction with Fmoc-Cl (9-fluorenylmethyl chloroformate) to yield the protected amino group 2'-NHFMOC.

122. A compound having the structure:



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or its enantiomer,

or a pharmaceutically acceptable salt, prodrug or derivative thereof.

123. A compound having the structure: